Course Title : Problem Solving Using Python and R Lab

Course Code : P21DS1P1

Lab1. Python Basics and Conditions

Question1. Write a program in Python to input length and breadth of a rectangle and print the

area and perimeter of it.

Test you code with atleast 2 test cases

```
length=int(input('Enter a number:'))
breadth=int(input('Enter a number:'))
area=length*breadth
perimeter=2*(length+breadth)
print('area=',area)
print('perimeter=',perimeter)
```

OUTPUT:

```
Enter a number:5
Enter a number:6
area= 30
perimeter= 22
```

Question2. Write a program, which accepts annual basic salary of an employee and calculates and displays the Income tax as per the following rules.

If Basic is less than Rs. 1,50,000/-, then Tax = 0.

If Basic is from Rs.1,50,000/- to Rs. 3,00,000/-, then tax is 20%.

If Basic is greater than Rs.3,00,000/-, then tax is 30%.

Print name, annual income and tax.

Write test cases to validate all conditions

```
name=input('Enter the name:')
basicsalary=int(input('Enter the amount:'))
if(basicsalary<150000):
    tax=0
elif(basicsalary>150000) and (basicsalary<300000):
     tax=basic*0.2
elif(basicsalary>300000):
    tax=basicsalary*0.3
```

```
else:
    print('you need not to pay incometax')
print('name:',name)
print('basicsalary',basicsalary)
print('tax',tax)
```

OUTPUT:

```
Enter the name:hari
Enter the amount:100000
name: hari
basicsalary 100000
tax 0
```

```
name=input('Enter the name:')
basicsalary=int(input('Enter the amount:'))
if(basicsalary<150000):
    tax=0
elif(basicsalary>150000) and (basicsalary<300000):
     tax=basicsalary*0.2
elif(basicsalary>300000):
    tax=basicsalary*0.3
else:
    print('you need not to pay incometax')
print('name:',name)
print('basicsalary',basicsalary)
print('tax',tax)
```

OUTPUT:

```
Enter the name: hari
Enter the amount:200000
name: hari
basicsalary 200000
tax 40000.0
```

```
name=input('Enter the name:')
basicsalary=int(input('Enter the amount:'))
if(basicsalary<150000):
    tax=0
elif(basicsalary>=150000) and (basicsalary<300000):
     tax=basicsalary*0.2
else:
    tax=basicsalary*0.3
print('name:',name)
print('basicsalary',basicsalary)
print('tax',tax)
```

OUTPUT:

```
Enter the name:hari
Enter the amount:350000
name: hari
basicsalary 350000
tax 105000.0
```

Question3. Write a program to accept quantity and rate for three (3) items. Compute the total

sales amount. Also compute and print the discount as follows:

Amount > Rs. 2000/- : 20% discount

Amount between Rs. 1500/- to Rs.1999/- :15% discount

Amount between Rs. 1000/- to Rs.1499/- 8 % discount

Compute final amount to be paid.

Print name, rate and quantity of 3 items. Then print total sales amount, total discount

and final amount to be paid to shop.

Write 3 test cases to validate all conditions

```
n1=input('enter 1st product name')
n2=input('enter 2nd product name')
n3=input('enter 3rd product name')
a=input('enter the 1st product cost:')
b=input('enter the 2nd product cost:')
c=input('enter the 3rd product cost:')
a1=input('enter 1st product quantity')
b1=input('enter 2nd product quantity')
c1=input('enter 3rd product quantity')
p1=int(a)*int(a1)
p2=int(b)*int(b1)
p3=int(c)*int(c1)
amt=int(p1)+int(p2)+int(p3)
if amt>2000:
    disc=amt*0.2
elif (amt>1500) and (amt<1999):
    disc=amt*0.15
elif (amt>1000) and (amt<1499):
    disc=amt*0.08
else:
    print('no discount')
print('1st product name : ',n1)
print('2nd product name : ',n2)
```

```
print('3rd product name : ',n3)
print('total amount : ',amt)
print('discount : ',amt-disc)
```

OUTPUT:

```
enter 1st product nameshirt
enter 2nd product namepant
enter 3rd product namedhoti
enter the 1st product cost:700
enter the 2nd product cost:800
enter the 3rd product cost:900
enter 1st product quantity4
enter 2nd product quantity2
enter 3rd product quantity1
1st product name :  shirt
2nd product name :  pant
3rd product name :  dhoti
total amount :  5300
discount :  4240.0
```

```
n1=input('enter 1st product name')
n2=input('enter 2nd product name')
n3=input('enter 3rd product name')
a=input('enter the 1st product cost:')
b=input('enter the 2nd product cost:')
c=input('enter the 3rd product cost:')
a1=input('enter 1st product quantity')
b1=input('enter 2nd product quantity')
c1=input('enter 3rd product quantity')
p1=int(a)*int(a1)
p2=int(b)*int(b1)
p3=int(c)*int(c1)
amt=int(p1)+int(p2)+int(p3)
if amt>2000:
    disc=amt*0.2
elif (amt>1500) and (amt<1999):
    disc=amt*0.15
elif (amt>1000) and (amt<1499):
    disc=amt*0.08
else:
    disc=0
print('1st product name : ',n1)
print('2nd product name : ',n2)
print('3rd product name : ',n3)
print('total amount : ',amt)
print('discount : ',amt-disc)
```

OUTPUT:

```
enter 1st product namewatch
enter 2nd product nameglass
enter 3rd product namebat
enter the 1st product cost:1000
enter the 2nd product cost:500
enter the 3rd product cost:200
enter 1st product quantity1
enter 2nd product quantity1
enter 3rd product quantity1
1st product name :  watch
2nd product name :  glass
3rd product name :  bat
total amount :  1700
discount :  1445.0
```

Question4. Evaluate the expressions using Pen and Paper first and then print the value.

X1=(11+31+23+8+7+5)/((1-(1/2)-(1/20)))

X2=(((10*8)+8-((7//5)%(54)))&3)|(2<<1)**

```
x1=(11+31+23+8+7+5)/((1-(1/2)-(1/20)))
print(x1)
x2=(((10*8)+8-((7//5)%(5**4)))&3)|(2<<1)
print(x2)
```

OUTPUT:

```
188.88888888888889
7
```

Question5. Write a program to accept name, marks for three subjects and find the total marks

secured, average and also display the class obtained.

Class I – above 80%

Class II – 60% to 80%

Pass class – 40% to 59% and

Fail otherwise

Print a message as "Congratulations << your name>>, you secured a total of <<total

marks>>, and Your class is <<class>>"Test you code with atleast 2 test cases

```
name=input('enter the name:')
s1=int(input('enter the mark:'))
s2=int(input('enter the mark:'))
s3=int(input('enter the mark:'))
totalmarks=s1+s2+s3
average=s1+s2+s3/3
if(average>80):
    c='class1'
elif(average>60) and (average<80):
    c='class2'
elif(average>40) and (average<59):
    c='passclass'
else:
    print('fail')
print('congratulations %s, U secured a total of %s, and your class is %s'
%(name,totalmarks,c))
```

OUTPUT:

```
enter the name:hari
enter the mark:80
enter the mark:80
enter the mark:80
congratulations hari, U secured a total of 240, and your class is class1
```

```
name=input('enter the name:')
s1=int(input('enter the mark:'))
s2=int(input('enter the mark:'))
s3=int(input('enter the mark:'))
totalmarks=s1+s2+s3
average=(s1+s2+s3)/3
if(average>=80):
    c='class1'
elif(average>60) and (average<80):
    c='class2'
elif(average>=40) and (average<=60):
    c='passclass'
else:
    print('fail')
print('congratulations %s, U secured a total of %s, and your class is %s'
%(name,totalmarks,c))
```

OUTPUT:

```
enter the name:hari
enter the mark:70
enter the mark:70
enter the mark:70
congratulations hari, U secured a total of 210, and your class is class2
```

```
name=input('enter the name:')
s1=int(input('enter the mark:'))
s2=int(input('enter the mark:'))
s3=int(input('enter the mark:'))
totalmarks=s1+s2+s3
average=(s1+s2+s3)/3
if(average>=80):
    c='class1'
elif(average>60) and (average<80):
    c='class2'
elif(average>=40) and (average<=60):
    c='passclass'
else:
    print('fail')
print('congratulations %s, U secured a total of %s, and your class is %s'
%(name,totalmarks,c))
```

OUTPUT:

```
enter the name:hari
enter the mark:50
enter the mark:50
enter the mark:50
congratulations hari, U secured a total of 150, and your class is passclass
```

```
name=input('enter the name:')
s1=int(input('enter the mark:'))
s2=int(input('enter the mark:'))
s3=int(input('enter the mark:'))
totalmarks=s1+s2+s3
average=(s1+s2+s3)/3
if(average>=80):
    c='class1'
elif(average>60) and (average<80):
    c='class2'
elif(average>=40) and (average<=60):
    c='passclass'
else:
    c='fail'
print('congratulations %s, U secured a total of %s, and your class is %s'
%(name,totalmarks,c))
```

OUTPUT:

```
enter the name:hari
enter the mark:20
enter the mark:10
enter the mark:20
congratulations hari, U secured a total of 50, and your class is fail
```

Question6. Read a number from keyboard. Print whether it is odd number, even number, positive number, negative number or zero. Also, print if its ASCII value represents a lower case or upper case letter or digit.

Write 8 test cases to validate odd, even, positive, negative, zero, lower case, upper case and digit input types

```
n=int(input('enter the value'))
c=input()
if n%2==0:
    print('the given number is even')
else:
    print('the given number is odd')
if n>0:
    print('The given number is positive')
if n<0:
    print('The given number is negative')
if (c>='A' and c<='Z'):
    print('upper case')
elif (c>='a' and c<='z'):
    print('lower case')
else:
    print('not upper nor lower' )
```

OUTPUT:

```
enter the value7
a
the given number is odd
The given number is positive
lower case
```

```
n=int(input('enter the value'))
c=input()
if n%2==0:
    print('the given number is even')
else:
    print('the given number is odd')
if n>0:
    print('The given number is positive')
if n<0:
    print('The given number is negative')
if (c>='A' and c<='Z'):
    print('upper case')
elif (c>='a' and c<='z'):
    print('lower case')
else:
    print('not upper nor lower' )
```

OUTPUT:

```
enter the value8
A
the given number is even
The given number is positive
upper case
```

```
n=int(input('enter the value'))
c=input()
if n%2==0:
    print('the given number is even')
else:
    print('the given number is odd')
if n>0:
    print('The given number is positive')
if n<0:
    print('The given number is negative')
if (c>='A' and c<='Z'):
    print('upper case')
elif (c>='a' and c<='z'):
    print('lower case')
else:
    print('not upper nor lower' )
```

OUTPUT:

```
enter the value-7
a
the given number is odd
The given number is negative
lower case
```

```
n=int(input('enter the value'))
c=input()
if n%2==0:
    print('the given number is even')
else:
    print('the given number is odd')
if n>0:
    print('The given number is positive')
if n<0:
    print('The given number is negative')
if (c>='A' and c<='Z'):
    print('upper case')
elif (c>='a' and c<='z'):
    print('lower case')
else:
    print('not upper nor lower' )
```

OUTPUT:

```
enter the value-8
A
the given number is even
The given number is negative
upper case
```